

NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

August 3, 2018

Systems Group Chairman's Factual Report

CEN17FA127

A. ACCIDENT

Location: near Chalmers, IN
Date: March 14, 2017
Time: 1546 eastern daylight time
Airplane: MD Helicopters 369FF helicopter, N530KD

B. GROUP

Group Chairman: Scott Warren
National Transportation Safety Board
Washington, D.C.

C. SUMMARY

On March 14, 2017, at 1546 eastern daylight time, an MD Helicopters 369FF helicopter, N530KD, impacted terrain during a power line construction flight. The pilot was fatally injured, and the helicopter was destroyed. The helicopter was registered to Robin M Rogers and operated by Rogers Helicopters, Inc., under the provisions of 14 Code of Federal Regulations Part 133 as an external load operation. Visual meteorological conditions prevailed at the time of the accident and no flight plan had been filed.

The technical details of the longitudinal and lateral trim actuators were reviewed, and the time duration for a full actuator travel event according to the manufacturers' documentation was determined.

D. DETAILS OF THE INVESTIGATION

1.0 Trim Actuators

Each of the two cyclic trim actuators consists of an actuator, housing support, trim tube, and spring assembly. The actuator is a motor-driven, variable length shaft that compresses a spring assembly, counteracting feedback forces from the main rotor and compensating for imbalance conditions such as those imposed by crosswinds or unevenly distributed cargo. Cyclic trim is controlled by the cyclic trim switch on top of the cyclic stick grip. When the trim switch is moved off center to any of the four trim positions, one of the trim motors operates to provide trim spring force in the desired direction.

For the accident helicopter, the lateral trim actuator was made by CEF Industries, Inc. The part numbers shown on the trim actuator body were 8222M and 369A70. According to MDHI, both of these part numbers are incomplete. The serial number was listed as 1300 in both locations. The part number listed on the actuator housing support was 369A7170-11. According to MDHI documentation, the 369A7170-11 actuator assembly should have a 369A7014 High Speed actuator installed.

The longitudinal trim actuator was a Parts Manufacturer Approval (PMA) component made by Aerometals. The part number was shown only on the actuator body and was 369X27001. The serial number was shown as HS306.

According to documentation provided by the actuator manufacturers, the total travel of each actuator (both lateral and longitudinal) from the fully retracted to the fully extended position was 3.5 inches.

According to the CEF test procedure for the 8222M6 actuator, the actuator is required to move from the fully retracted to the fully extended position in 30-50 sec while loaded at 85 lbs, and the actuator is required to move from the fully

extended to fully retracted position in 30-50 sec while loaded at 163 lbs. The “no-load” test requirement states that the actuator should go full travel taking no longer than 38.2 sec.

According to the MDHI 369A7014 High Speed actuator source control drawing, the time for the actuator to travel 1.75 inches (1/2 of the complete range of motion) is 15-25 sec with a load varying from 0 to 325 lbs tension.

According to the Aerometals test procedure for the longitudinal trim actuator, the time for the actuator to fully extend or retract with no load should be under 17.5 sec. The test procedure also specifies that the actuator should be able to move 1.75 inches under normal loading (85 lb compression load or 163 lb tension load) in between 7-12 sec.

Reviewing all of the actuator travel time requirements determined that the time an actuator should take to move 1.75 inches (half of the full travel range) can vary between 7-25 sec.

The MDHI aircraft maintenance manual for the MD 369FF helicopter (document CSP-HMI-2, Rev 31) contains a “Cyclic Trim Actuator Bench Testing” procedure (item 15 within chapter 67-10-00, pages 524-528) which specifies a test procedure for the cyclic trim actuators.

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